MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017

PEM0016 – ALGEBRA

(All Groups)

11 MARCH 2017
2.30 p.m – 4.30 p.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **3** pages including the cover page.
2. Attempt **ALL FOUR** questions. All questions carry equal marks and the distribution of marks for each question is given.
3. Please write all your answers in the answer booklet provided.

Answer ALL the questions (100 marks).

Question 1 (25 Marks)

(a) Solve $2\sqrt{x} + 5x^{1/4} - 3 = 0$. (5 marks)

(b) The coefficient of x^5 in the expansion of $(2 + ax)^6$ is 12 times larger than the coefficient of x^5 in the expansion of $(3x - 1/x)^5$. Find the value of a.

(9 marks)

(c) Solve $\sqrt{5 + 4\sqrt{x}} = \sqrt{x}$. Express your answer using **solution set**. (6 marks)

(d) Solve the inequality and express your answer using **interval notation**.

$$\frac{x^2 - 2x - 15}{(2 - x)(x + 6)^2} \leq 0$$

(5 marks)

Question 2 (25 Marks)

(a) Given function $p(x) = \dfrac{3x-5}{2-x}$ and $(p \circ q)(x) = \dfrac{8x-10}{4-3x}$.

(i) Find the function $q(x)$. (5 marks)

(ii) Determine the domain of $(p \circ q)(x)$ and express the domain using **solution set**. (4 marks)

(b) Determine the inverse function of $f(x) = 4\ln\left(\dfrac{1}{3}x\right) + 2$. (5 marks)

(c) Sketch the function $g(x) = -3x^2 - 6x - 1$ using transformations.
Show each transformation in separate graph (4 graphs).
Label three coordinates in each graph. (11 marks)

Continued...

Question 3 (25 Marks)

(a) Find the partial fraction decomposition of $\frac{2x^2-49x-21}{(x^2+2)(x-5)}$. (12 marks)

(b) Given a polynomial function $f(x)=(x+3)(mx-n)+m(x+2)$.

When $f(x)$ is divided by $(x+2)$, the remainder is 5.
When $f(x)$ is divided by $(x+3)$, the remainder is 4.

Determine the values of m and n. (7 marks)

(c) Sketch the polynomial function $g(x)=x(x+1)^2(x-5)$ and label all real zeros in the graph. (6 marks)

Question 4 (25 Marks)

(a) Solve the following equations by using **inverse matrix method.**

$$\begin{cases} 2x-y+3z=18 \\ x+3z=11 \\ x+2y+4z=4 \end{cases}$$

(17 marks)

(b) Solve the following system using **Cramer's Rule.**

$$\begin{cases} 5x+2y=-1 \\ x-3y=-24 \end{cases}$$

(8 marks)

End of Paper